FACT SHEET FOR NPDES PERMIT WA-000029-9

FACILITY NAME: Vanalco, Inc.

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (chapter 173-220 WAC), and water quality criteria for surface and ground waters (chapters 173-201A and 200 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

This fact sheet has been reviewed by the permittee and errors in fact have been corrected. After the public comment period closes, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments (Appendix D) will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Changes to the permit will be addressed in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Vanalco, Inc.
Facility Name and Address	Vanalco, Inc. 5701 NW Lower River Rd. P.O. Box 9805 Vancouver, WA 98666
Type of Facility:	Primary Aluminum Smelter
SIC Code	3334
Discharge Location: Outfall 001 Outfall 002	Waterbody name: Columbia River Latitude: 45° 38' 58" N Longitude: 122° 44' 41" W. Latitude: 45° 38' 31" N Longitude: 122° 43' 29" W.
Water Body ID No.	WA-CR-1010

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The Vanalco smelter was originally owned and operated by The Aluminum Company of America (Alcoa). The smelter was constructed in 1939 and began producing metal in 1940. In 1986, Alcoa shut the smelter down. In 1987, Bay Resources Inc, a Massachusetts company, purchased and restarted the smelter as Vanalco, Inc.

INDUSTRIAL PROCESS

Vanalco is a primary aluminum smelter, SIC 3334. Located 4 miles west of Vancouver on the shore of the Columbia River, the smelter produces about 350 tons of aluminum daily and employees 670 people. The smelter consists of five potlines with a total of 650 center-worked pre-bake pots, a carbon plant and green mill to manufacture anodes, anode baking furnaces, and cast house.

Vanalco has owned and operated the former Alcoa, Vancouver Works smelter since 1987. Following the sale, Alcoa retained both the NPDES permit and water treatment systems, while Vanalco personnel operated these systems under agreement with Alcoa. In January 1995, Alcoa transferred ownership of the NPDES permit and all wastewater treatment systems to Vanalco. At that time, Vanalco assumed sole responsibility for the NPDES permit and treatment systems.

Several upgrades have occurred during the current permit term. The force main from the plant sump to the treatment lagoons was replaced in the summer of 1992. In addition, the industrial wastewater treatment lagoons were relined in the summer of 1994. Vanalco has reduced the use of oils to lubricate anode molds, which will reduce oil and grease discharged to the river.

When the current permit was written, Vanexco, an anodizing and extrusion mill, and ACPC, an aluminum wire mill, were in operation. Both operations contributed wastewater and pollutants to Vanalco discharges. However, both companies have shut down. Vanexco ceased operations in 1991 and ACPC will close by the end of 1997.

Current wastewater sources include contact and non-contact cooling water from the smelter and stormwater runoff from both the smelter and adjoining areas. Vanalco's non-contact sources are hydraulic oil and bearing cooling in Building 54 (12 million gallons per year, 0.033 MGD), Building 62 air compressors and air dryers (108 million gallons per year, 0.30 MGD), Lectromelt furnaces (2900-5800 gpd), Building 32 hydraulic oil coolers (16.8 million gallons per year, 0.046 MGD), and preheat furnace (60 million gallons per year, 0.164 MGD). Vanalco's contact water sources are the brick masons hose (4.2 million gallons per year, 11,520 gpd), D pit log ingot caster (270 million gallons per year, 0.74 MGD), 900 pound pig caster (18 million gallons per year, 0.05 MGD), 30 pound pig caster (21 million gallons per year, 0.058 MGD), and curtain wall sprinklers (20 million gallons per year, summer only).

The streams mentioned above and stormwater are treated via sedimentation and oil and grease removal in Vanalco's lagoon treatment system. This combined wastestream is then discharged through Outfall 001 to the Columbia River.

Domestic wastewaters from the smelter are treated onsite prior to discharge through Outfall 002 to the Columbia River. The sanitary plant consists of preliminary screening, primary clarification, secondary treatment via trickling filter tower, secondary clarification, and chlorination/ dechlorination. In 1996, this wastestream's average flowrate was 54,000 gpd.

Design Standards for Outfall 002 WWTP

Parameter	Design Quantity	1996 Average
Average Flow, MGD	0.048	0.054
Peak Flow, MGD	0.288	0.071
Population equivalent (# of people)	1800	670

DISCHARGE OUTFALL

Outfall 001 discharges four miles downstream from the Interstate 5 bridge at River Mile 103, which is at the downriver end of the treatment lagoons. The wastewater is transported via 36 inch pipe that follows the river bottom 150 feet offshore and is discharged from the end of a straight pipe with no diffuser.

Outfall 002 discharges about 0.75 miles upstream from Outfall 001, and directly adjacent to the sanitary wastewater treatment plant. The outfall pipe has no end diffuser.

PERMIT STATUS

The current permit for this facility was issued on January 31, 1990 and modified on February 14, 1992. The current permit places effluent limitations as follows:

Table 1: **Effluent limitations & monitoring requirements:** ***Outfall 001***

Parameter	Units	Average Monthly	Maximum Daily	Monitoring Frequency	Sample Type
Total Suspended Solids	lbs/day	400	760	Daily	24 hr comp
Fluoride	lbs/day	100	200	Daily	24 hr comp
Aluminum	lbs/day	35	80	Daily	24 hr comp
Total Cyanide	lb/day	0.15	0.4	Daily	24 hr comp
Benzo(a)Pyrene	lbs/day	0.002	0.004	Daily	Composite*
Oil and Grease	lbs/day	70	150	Daily	Grab
pH		Min. 6.0	Max. 9.0	Continuous	Continuous
Antimony	lbs/day	2.0	3.0	2/week	24 hr comp
Nickel	lbs/day	2.4	3.4	Daily	24 hr comp
Chromium	lbs/day	0.8	1.5	2/week	24 hr comp
Zinc	lbs/day	1.8	3.9	Daily	24 hr comp
Temperature	^{o}F	-	-	Continuous	Continuous
Flow	MGD	-	-	Continuous	Continuous
Precipitation	inches	-	-	Daily	24 hr. Sample
Production:		-	-	Daily	Monthly Avg.
Aluminum metal	tons/day	-	-	-	Daily Average
Anodes	tons/day	-	-	-	Daily Average
Direct chill casting	tons/day	-	-	-	Daily Average
Extrusion	tons/day	-	-	-	Daily Average
Anodizing	tons/day	-	-	-	Daily Average

***** - Current permit requires composite sample to be collected daily at anode contact cooling water discharge location. If discharge occurs, sample is analyzed and effluent mass calculated.

Table 2: Effluent limitations & monitoring requirements: *Outfall 002*

Parameter	Units	Monthly Average	Weekly Average	Monitoring Frequency	Sample Type
Biochemical Oxygen Demand (5 day BOD)	mg/L % rem.	25.0 >/= 65	45.0	2/Week	24 hr comp
Total Suspended Solids (TSS)	mg/L % rem.	30.0 >/= 65	45.0	Daily	24 hr comp
Chlorine	ppm	Daily Minimum 0.0	Daily Maximum 1.0	Daily	Grab
Fecal Coliform	# /100 mL	200	400	1/Week	Grab
pH		Daily Minimum 6.0	Daily Maximum 9.0	1/week	Grab
Flow	MGD			Continuous	Continuous

An application for permit renewal was submitted to the Department on February 22, 1994 and officially accepted by the Department on August 20, 1996.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

Vanalco last received an unannounced Class 2 inspection on May 22, 1997 and an unannounced Class 1 inspection on June 30, 1997. The facility was found to be in compliance with permit requirements at the time of both inspections.

During the history of the previous permit, the Permittee has remained in substantial compliance based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department. Noncompliance events were reported as follows:

- 1997: Zero.
- 1996: Vanalco had one fecal coliform violation in January and a fecal coliform violation in June.
- 1995: Vanalco reported one daily oil and grease violation in April.
- 1994: Alcoa had one daily violation of cyanide in February and one daily violation of fluoride in October.
- 1993: Alcoa reported two fecal coliform violations in March.
- 1992: Alcoa reported the following violations: % BOD removal in January, February, March, and December; % TSS removal in January; one pH in January; one zinc in February; and one fecal coliform in December.

- 1991: Alcoa reported one chlorine residual violation in March and October; one fluoride in March and April; and one % BOD removal in December.
- 1990: Alcoa had violations as follows: January, three fecal coliform; February- eight B(a)p; March- one % TSS removal; April- three chlorine residual; August- one chlorine residual & two fecal coliform; September- one zinc & one fluoride; October- one chlorine residual; November- one % TSS removal and one % BOD removal.

Vanalco's permit requires compliance with approximately 352 effluent limits per month at outfalls 001 and 002 (total number of individual parameters with a limit for both outfalls- does not include monitoring requirements and continuous pH compliance). For 1990 through 1997, this was about 33,800 limits with which to comply.

WASTEWATER CHARACTERIZATION

The proposed wastewater discharge is characterized for the following regulated parameters:

Table 3: Wastewater Characterization of Outfall 001

Parameter	Concentration, mg/L	Parameter	Concentration, mg/L
Cyanide	<0.003	Nitrogen, tot. organic	<0.1
Fluoride	2.0	Phosphorus	0.22
Oil & Greases	<2.0	Iron	0.044
TSS	<7.9	Manganese	0.251
Aluminum	<0.3	Arsenic	<0.0035
Antimony	<0.037	Beryllium	<0.005
Chromium	<0.005	Cadmium	<0.001
Nickel	<0.015	Copper	<0.0069
BOD	<5	Mercury	<0.0017
Ammonia	<0.5	Selenium	<0.002
Temperature	</= 34^{o} C. (ambient)		

Table 4: Wastewater Characterization at Outfall 002

Parameter	Concentration, mg/L
BOD	<9
TSS	<7.6
Tot. Chlorine Residual	0.02
Fluoride	1.2
Fecal Coliform, #/100 mL	37

The values listed in Tables 3 and 4 were taken from the long term average value column of Vanalco's permit renewal application, Section V, Intake and Effluent Characteristics.

SEPA COMPLIANCE

This permit renewal has no SEPA compliance issues.

PROPOSED PERMIT LIMITATIONS AND CONDITIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). On a case-by-case basis, Best Professional Judgment (BPJ) may be used.

Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The more stringent of these limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis and the limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, and they don't have a reasonable potential to cause a water quality violation. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology.

The Department reviewed the applicant's Form R (Toxic Release Inventory Reporting Form) list of Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III hazardous substances and Form 2C of the NPDES Permit Application. The Department also reviewed the discharge monitoring reports (DMR), study results, and waste water inspection reports generated during the term of the current permit.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Best Professional Judgment (BPJ) was used to establish effluent limitations in this permit for conventional, nonconventional, and toxic pollutants. The applicant has building block allowances from two applicable subcategories in 40 CFR Part 421 Subpart B. These allowances are shown in Table 5.

Table 5: Building Block Allowances

Building Block Allowances	Production, tons/day	Allowance, lb/day (monthly average) (daily maximum)			
		Al	F	O&G	TSS
Direct Chill Casting Cooling (Vanalco)	395	2.85 6.4(1)	27.7 62.5(2)	0	0

(1): 3.602 lb & 8.120 lb/500 tons of DCC product

(2): 35.090 lb. & 79.080 lb/500 tons of DCC product

Vanalco's outfall 001 conveys both process wastewater and stormwater. A stormwater allowance is necessary, in addition to process waste allowances via building blocks. Therefore, the decision was made to base the proposed limits of TSS, oil and grease, aluminum, and fluoride on past performance, as allowed by BPJ.

Vanalco's monitoring data for 1993, 1994, 1995, and part of 1996, were closely analyzed. Statistical analyses were performed on these data to develop potential limits. The proposed limits represent the 99 and 95 percentile of the log transformed data, as shown below:

Proposed Limits (lb/day)	95th percentile Monthly Average	99th percentile Daily Max.
TSS	172	383
Fluoride	70	154
Aluminum	14	40
Oils & Greases	41	93

Ecology believes that Vanalco's treatment system provides AKART, which is a lagoon system that provides oil and grease removal, flow distribution to minimize shortcircuiting, and reasonable detention time for settling. In addition, some natural biological treatment occurs. Oil and greases are removed by oil booms and also by natural processes. More advanced treatment processes are not feasible because the pollutants are very dilute and exist at concentrations below recognized treatability levels.

At outfall 001, Ecology proposes to retain seven day per week monitoring for TSS, aluminum, fluoride, and oils & grease. The Industrial Section of Ecology has declared these parameters to be 'critical' parameters for aluminum smelter discharges. As such, these parameters are not eligible for monitoring reduction consideration.

Ecology proposes to remove the current limits and monitoring requirements for antimony, chromium, nickel, and zinc. These metals are no longer used or associated with Vanalco's smelting processes. In addition, these pollutants are no longer discharged at treatable levels and at concentrations that could potentially affect water quality. These metals were primarily associated with the anodizing facility, which is no longer in operation and has no discharge.

Ecology proposes to modify limits and monitoring for benzo(a)pyrene -B(a)P- as well. One of Vanalco's historical internal waste streams was anode contact cooling water. Early in the last permit term, Vanalco began recycling this waste stream. The permit required Vanalco to collect a sample of the closed loop water, and to analyze the sample for B(a)P when and if anode contact cooling water was discharged, which never occurred. Vanalco does not store green pitch or anodes outside, or conduct any other practice that could allow B(a)P or other polynuclear aromatic hydrocarbons to become waterborne. No other sources of B(a)P at Vanalco are known, and limited sampling at outfall 001 has not detected B(a)P. If Vanalco changes any current method of operation that could increase levels of B(a)P or if significant levels are detected, Ecology will reinstate monitoring and/or limits into the permit.

Ecology proposes to remove the limits and reduce the monitoring for cyanide. Spent potliner (SPL), which is the source of cyanide at aluminum smelters, is handled in a manner that effectively prevents the introduction of cyanide into wastewater streams. Concentrations are generally below or at the practical quantitation limit of 0.002 mg/L. When detected, cyanide is associated with stormwater contamination due to past practices. Monitoring is proposed to be reduced from daily to once per week. If Vanalco changes their SPL handling practices such that contact with water could occur, or if the Department has any reason to be concerned about cyanide in the wastewater, Ecology will increase monitoring and/or reinstate cyanide limits into the permit.

The effluent pH limits are proposed to remain at 6.0 to 9.0. This limitation is based on Best Practicable Control Technology (BPT) from guidelines in 40 CFR Part 421.22. This range (6.0 to 9.0) will not result in water quality violations. Because of Vanalco's mixing zone, excursions slightly above or below this range would not cause a water quality exceedance outside the mixing zone.

For the sanitary treatment system at outfall 002, Ecology proposes to retain the existing technology-based limits. Parametric monitoring rates will also remain the same.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Surface water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The U.S. EPA has promulgated 91 numeric water quality criteria for the protection of human health that are applicable to Washington State (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be found in WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in chapter 173-201A WAC. Therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a degradation of existing water quality or beneficial uses. In addition, Ecology proposes to require Vanalco to conduct a receiving water study to estimate background concentrations of pollutants of concern. This study will be conducted during the next permit term, as specified by order.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention and control (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria. The Department has authorized a mixing zone for this permit.

Chronic Mixing Zone- Outfall 001

The length of the chronic mixing zone shall extend in a downstream direction from the discharge port for three hundred (300) feet plus the depth of the diffuser, which is thirty-five (35) feet for a total of three hundred and thirty five (335) feet. The chronic mixing zone shall extend upstream a distance of one hundred (100) feet. The width of the chronic mixing zone shall be the length of the diffuser, zero (0) feet, plus fifty (50) feet on each side of the diffuser for a total of one hundred feet. The dilution ratio at the edge of this chronic zone has been calculated to be 70 to 1 (70:1). This information was supplied as a requirement of the previous permit and has been approved by Ecology.

Acute Mixing Zone- Outfall 001

The acute mixing zone is ten percent (10%) of the chronic zone as previously defined. This zone shall be thirty-three (33) feet in any horizontal direction from the outfall. The dilution ratio for the acute zone has been calculated to be 4 to 1 (4:1). This information was supplied as a requirement of the current permit and has been approved by Ecology.

Acute Mixing Zone- Outfall 002

A preliminary estimate of the acute dilution factor was made for this discharge based on the allowable percent flow of the receiving water, using the following formula:

acute dilution factor = $[Q_{effluent} + (2.5\% \, Q_{stream})]/Q_{effluent}$

where, $Q_{effluent}$ = effluent flow during critical condition, 0.071 million gallons /day (MGD) and,

Q_{stream} = receiving water flow, 54×10^3 MGD.

Based on this rough estimate, the acute dilution factor is about 1900. Because of the high dilution available, Vanalco will not be required to conduct a mixing zone study for this outfall.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to the Columbia River which is designated as a Class A receiving water in the vicinity of the outfall. No other point source outfalls are nearby, other than Vanalco's sanitary outfall. No sources of significant non-point pollutants are nearby. Characteristic uses include the following:

Class A (excellent)- water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Table 6

Fecal Coliforms	100 colonies/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	20 degrees Celsius maximum
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTU above background
Toxics	No toxics in toxic amounts

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in chapter 173-201A WAC and is defined under the Mixing Zone section above.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of the UM (UMERGE) model. The dilution factors are described in the acute and chronic mixing zone sections above and are listed in Table 7 below:

Table 7:

	Acute	Chronic
Aquatic Life	4	70
Human Health, Carcinogen	NA	70
Human Health, Non-carcinogen	NA	70

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect. The derivation of surface water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the Columbia River is the seven day average low river flow with a recurrence interval of ten years (7Q10). Ambient data at critical conditions in the vicinity of Vanalco's outfall 001 was taken from the Columbia River Reconnaissance Survey conducted during the low flow period (Tetra Tech, May 1992). The ambient background data used for this permit includes the following information from Vanalco's dilution ratio study (ENSR, 1993).

Table 8: Columbia River Ambient Data

Parameter	Value used
7Q10 low flow	83690 cfs.
Velocity	0.955 ft/sec.
Depth	37.78 feet.
Width	2314 feet.
Temperature	10.61 ^{o}C
pH (high)	7.35
Fecal Coliform	41/100 mL dry weather (>100/100 mL storm related)
Hardness	62 mg/L as CaCO3.
All Other Metals	below detection limits

The impacts of BOD, temperature, pH, and toxics were determined as shown below, using the dilution factors at critical conditions described above.

BOD--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature and pH--Under critical conditions there is no predicted violations of the Water Quality Standards for Surface Waters for pH and temperature. Therefore, the technology-based effluent limitations for pH was placed in the permit, and no limit for temperature.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, copper and cadmium. A reasonable potential analysis (see Appendix C) was conducted on all known or suspected effluent parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for all discharged pollutants to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The critical condition in this case occurs during periods of low river flow, high effluent discharge flowrate, and low effluent and receiving water temperature. The parameters used in the critical condition modeling are as follows: acute dilution factor 4, chronic dilution factor 70, receiving water temperature 10.61 ^{o}C, and receiving water alkalinity 62 mg/L (as mg $CaCO_3$/L).

Based on these calculations, only chlorine was determined to have a reasonable potential to cause a violation of the water quality standards. However, Vanalco has submitted information that questions the validity of the chlorine residual data for outfall 001. Specifically, Vanalco believes that measured chlorine residuals are at least partly due to the presence of manganese, which causes a false positive chlorine residual value. Therefore, Vanalco will conduct a study to determine actual chlorine residual concentration. Based on these results, Ecology will add chlorine residual limits at the outfall or remove the issue from further consideration.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. These tests provide an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle, or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC_{50}, EC_{50}, IC_{25}, etc. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

In accordance with WAC 173-205-040, the Permittee's effluent has been determined to have the potential to contain toxic chemicals. The Permittee conducted toxicity testing during the previous permit term in order to characterize both the acute and chronic toxicity of the effluent. The following are the results of the acute characterization study:

Table 9: Acute Toxicity Characterization Study Summary

SAMPLE	SALMONID	FATHEAD MINNOW	DAPHNID	
DATE	%SURVIVAL	%SURVIVAL	SPECIES	%SURVIVAL
5/13/91	100	80	D. magna	95
6/21/92	100	100	D. magna	100
9/9/92	100	100	D. pulex	100
11/15/92	100	100	D. pulex	100
1/27/94	97			
8/24/94			D. pulex	100
2/28/95	100			
5/2/95	100		D. pulex	100
8/8/95		100		
11/14/95	100			
2/27/96			D. pulex	95
6/4/96	100	100		
8/20/96	96.7			

The criteria for deciding if an acute WET limit is required is a median survival of 80% in 100% effluent and no test with a survival of less than 65%. The results for rainbow trout, fathead minnow, and Daphnia are well above the decision criteria. No acute permit limit is required according to chapter 173-205-050(2)(a)(i) WAC. The Permittee will be required to retest the effluent prior to application for permit renewal in order to demonstrate that toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard". The Permittee may demonstrate to the Department that changes have not

increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

Chronic toxicity was also measured during effluent characterization in the previous permit term. The following are the results of the chronic characterization study:

Table 10: Chronic Toxicity Characterization Study Summary

SAMPLE DATE	FATHEAD MINNOW		CERIODAPHNIA Dubia		SELENASTRUM capricornutum	
	NOEC	LOEC	NOEC	LOEC	NOEC	LOEC
11/17/92	>100	>100	>100	>100	6.25	12.5
3/16/93	>100	>100	>100	>100		
3/18/93					>100	>100
5/18/93	>100	>100				
5/20/93					50	100
6/8/93			>100	>100		
9/28/93	>100	>100	>100	>100	>100	>100

The criteria for determining if a chronic WET limit is required is a statistically significant difference in response between the control and the acute critical effluent concentration (ACEC). The ACEC for this discharge is 20%. The lowest observed effect concentration (LOEC) for the Selenastrum capricornutum results for November 17, 1992 was 12.5% effluent. A chronic toxicity limit is therefore required. The chronic toxicity limit is no statistically significant difference in test organism response between the chronic critical effluent concentration (CCEC), 1.4% of the effluent, and the control. The chronic toxicity limit is set relative to the mixing zone established in accordance with WAC 173-201A-100. The CCEC is the concentration of effluent existing at the boundary of the mixing zone during critical conditions.

Monitoring for compliance with a chronic toxicity limit is accomplished by conducting a chronic toxicity test using a sample of effluent diluted to equal the CCEC and comparing test organism response in the CCEC to organism response in nontoxic control water. The Permittee is in compliance with the chronic toxicity limit if there is no statistically significant difference in test organism response between the CCEC and the control.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal.

HUMAN HEALTH

The Department has determined that the effluent is likely to have chemicals of concern for human health. The discharger's high priority status is based on knowledge of data or process information indicating regulated chemicals occur in the discharge.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department reviewed the discharger characteristics, effluent characteristics, and sediment sampling study conducted during the current permit term. Ecology determined that this discharge has no reasonable potential to violate the Sediment Management Standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore requires no limitations based on potential to affect ground water. Vanalco owns the two treatment lagoons for outfall 001. When upgraded in 1994, the lagoons were lined with two layers of geomembrane and a leak detection system.

COMPARISON OF PROPOSED EFFLUENT LIMITS WITH THE EXISTING PERMIT

Current versus proposed effluent limits are compared below. Outfall 001 is shown in Tables 11 and 12, and Outfall 002 is compared in Tables 13 and 14.

Table 11: Outfall 001 Existing Limits & Monitoring Frequencies

	Monthly Average	Daily Maximum	Monitoring Frequency	Requirements Sample Type
B(a)P*	0.002 lbs/day	0.004 lbs/day	Daily	24-hr comp.
Antimony	2.0 lbs/day	3.0 lbs/day	2/week	24-hr comp.
Nickel	2.4 lbs/day	3.4 lbs/day	Daily	24-hr comp.
Cyanide	0.15 lbs/day	0.4 lbs/day	Daily	24-hr comp.
Chromium	0.8 lbs/day	1.5 lbs/day	Daily	24-hr comp.
Zinc	1.8 lbs/day	3.9 lbs/day	Daily	24-hr comp.
Fluoride	100.0 lbs/day	200.0 lbs/day	Daily	24-hr comp.
Aluminum	35.0 lbs/day	80.0 lbs/day	Daily	24-hr comp.
Oil & Grease	70.0 lbs/day	150.0 lbs/day	Daily	24-hr comp.
TSS	400.0 lbs/day	760.0 lbs/day	Daily	24-hr comp.
pH	6.0 to 9.0	at all times	Continuous	Continuous

***** Monitoring location and point of compliance is anode contact cooling water discharge.

Table 12: Outfall 001 Proposed Limits & Monitoring Frequencies

	Monthly Average	Daily Maximum	Monitoring Frequency	Requirements Sample Type
Antimony	none	none	none	none
Nickel	none	none	none	none
Cyanide	none	none	1/week	24-hr comp.
Chromium	none	none	none	none
Zinc	none	none	none	none
Fluoride	70.0 lbs/day	154 lbs/day	Daily	24-hr comp.
Aluminum	14.0 lbs/day	40.0 lbs/day	Daily	24-hr comp.
Oil & Grease	41.0 lbs/day	93.0 lbs/day	Daily	24-hr comp.
TSS	172 lbs/day	383 lbs/day	Daily	24-hr comp.
pH	6.0 to 9.0	at all times	Continuous	Continuous
Chronic Toxicity			1/quarter	24-hr comp.

Table 13: Outfall 002 Existing Limits & Monitoring Frequencies

	Monthly Avg	Weekly Avg.	Monitoring Frequency	Requirements Sample Type
BOD	25 mg/L	45 mg/L	2/week	24-hr comp.
BOD removal	>/=65%		1/week	24-hr. comp.
TSS	30 mg/L	45 mg/L	Daily	24-hr comp.
TSS removal	>/=65%		1/week	24-hr comp.
Chlorine Res.	0.0 to 1.0	mg/L	Daily	grab
Fecal Colif.	200/100 mL	400/100 mL	1/week	grab
pH	6.0 to 9.0	at all times	1/week	grab
Flow			continuous	continuous

Table 14: Outfall 002 Proposed Limits & Monitoring Frequencies

	Monthly Avg	Weekly Avg.	Monitoring Frequency	Requirements Sample Type
BOD	25 mg/L	45 mg/L	2/week	24-hr comp.
BOD removal	>/=65%		1/week	24-hr. comp.
TSS	30 mg/L	45 mg/L	Daily	24-hr comp.
TSS removal	>/=65%		1/week	24-hr comp.
Chlorine Res.	</=1.0	mg/L	Daily	grab
Fecal Colif.	200/100 mL	400/100 mL	1/week	grab
pH	6.0 to 9.0	at all times	1/week	Grab
Flow			continuous	Continuous

MONITORING AND REPORTING

Effluent monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring and testing schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

OTHER PERMIT CONDITIONS

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to update this plan and submit it to the Department.

SOLID WASTE PLAN

The Department has determined that the Permittee has potential to cause pollution of the waters of the state from leachate of solid waste. This proposed permit requires, under the authority of RCW 90.48.080, that the Permittee update the solid waste plan designed to prevent solid waste from causing pollution of the waters of the state. The plan must be submitted to the local permitting agency for approval, if necessary, and to the Department.

TREATMENT SYSTEM OPERATING PLAN

In accordance with state and federal regulations, the Permittee is required to take all reasonable steps to properly operate and maintain the treatment system (40 CFR 122.41(e)) and WAC 173-220-150 (1)(g). An operation and maintenance manual was submitted as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Implementation of the procedures in the Treatment System Operating Plan is a reasonable measure to ensure compliance with the terms and limitations in the permit.

STORMWATER POLLUTION PREVENTION PLAN

Pursuant to RCW 90.48 and Sections 302 and 402 of the Clean Water Act, Best Management Practices (BMP's) may be incorporated as permit conditions. BMP's are actions or procedures to prevent or minimize the potential for the release of pollutants or hazardous substances in significant quantities to surface waters. A Stormwater Pollution Prevention Plan (SWPPP) is being required in the proposed permit. Ecology's goals and objectives for developing and implementing SWPPP plans are to identify, reduce, eliminate, and prevent pollution from stormwater to waters of the state. The SWPPP should identify BMP's to reduce pollution from stormwater. Ecology has developed guidance for SWPPP's, dated September 1993, which is entitled "Stormwater Pollution Prevention Planning for Industrial Facilities."

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations. They have been standardized for all individual NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters. Ecology will base this decision on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this proposed permit be issued for 5 years.

REVIEW BY THE PERMITTEE

A proposed permit and fact sheet was reviewed by the Permittee for verification of facts. Only factual items were corrected in the draft permit and fact sheet.

REFERENCES FOR TEXT AND APPENDICES

ENSR. January 1994. Aluminum Company of America, Vancouver Works Baseline Sediment Characterization. ENSR Consulting and Engineering, Document Number 0225-006-405.

ENSR. October 1993. Aluminum Company of America, Vancouver Washington Dilution Ratio Study. ENSR Consulting and Engineering, Document Number 0225-006-504.

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Tetra Tech. May 1992. Task 6: Draft Reconnaissance Report. Reconnaissance Survey of the Lower Columbia River. The Lower Columbia River Bi-State Program.

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on September 5 and September 12, 1994 in the Vancouver *Columbian* newspaperto inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on February 02, 1998 in *The Columbian* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 AM. and 4:30 PM weekdays, by appointment, at the Department of Ecology-Library, 300 Desmond Drive, Lacey, Washington. These documents are also available in Vancouver at:

Department of Ecology
Vancouver Field Office
2108 Grand Boulevard

Fort Vancouver Public Library
1007 E. Mill Plain Boulevard

Written comments should be mailed to:

Don Reif, Permit Coordinator
Department of Ecology, Industrial Section
PO Box 47706
Olympia, WA 98504-7706

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

APPENDIX B -- GLOSSARY REFERENCES FOR TEXT AND APPENDICES

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Class 1 Inspection--A walk-through inspection of a facility that includes a visual inspection and some examination of facility records. It may also include a review of the facility's record of environmental compliance.

Class 2 Inspection--A walk-through inspection of a facility that includes the elements of a Class 1 Inspection plus sampling and testing of wastewaters. It may also include a review of the facility's record of environmental compliance.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Daily Maximum Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

Monthly Average --The average of the measured values obtained over a calendar month's time.

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICIAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at http.www:wa.gov.ecology.

APPENDIX D--RESPONSE TO COMMENTS